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ABSTRACT

New legislation on education, introduced in Brazil from 1968 to 1971, addresses university entrance requirements and exam characteristics by calling for centralization of exam preparation, examinee registration, test administration, test scoring and result reporting, and the use of objective tests. The Brazilian educational structure has three degree levels with the First Degree covering the first eight years of schooling, the Second Degree covering the next three, and the Third Degree all additional education. Students who are classified are admitted to the First Cycle of the Third Degree which consists of a year's preparation for professional programs. Classification follows a predetermined quota for a major area of study. Only those students who have declared a major area of study and who have a high ranking will be classified. The new legislation requires that the content of entrance examinations should correspond to the difficulty level of the core courses of language, social studies, science, and mathematics in the Second Degree schools and that the examinations should be objective, avoid questions involving sheer memorization, and test scores should be transformed into standard scores. (BJG)

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University Entrance Examinations in Brazil: Measurement Procedures

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Fundacao Carlos Chagas

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UNIVERSITY ENTRANCE EXAMINATIONS IN BRAZIL: MEASUREMENT PROCEDURES

Introduction

The purpose of this paper is to describe the entrance examinations used by Brazilian universities. The emphasis is on measurement procedures used at present and on perspectives for research and evaluation of the entire process.

The Brazilian educational system differs from the American system in several respects. These are, in turn, related to the organization and the function of university entrance exams. The first part of this paper briefly describes the structure of the system. This kind of information is basic to understanding the entrance examinations process.

The description of the entrance examination process focuses on recent policies which are requiring a gradual implementation of new procedures, and presents a general picture of the testing programs.

Finally, the need for an evaluation of the process is related to some trends in the school population, and the possible contribution of research is pointed out.

The Structure of the Educational System

The educational system is currently being reformulated as a result of new legislation introduced from 1968 to 1971. All levels of the Brazilian education system are now gradually adapting to the new requirements. These requirements are leading to a new structure whose essential characteristics are illustrated in Figure 1.

The figure shows that the structure has three degree levels. The First Degree consists of 8 grades or years of schooling. This is compulsory education for those of age 7 through 14. For the sake of simplicity, some features of the system are not represented in the diagram, as for example, special education for the blind, or for the mental defectives, etc. The First Degree schooling emphasizes general education.

The Second Degree level covers three years of schooling. Here, the objectives of a general education and of vocational training are combined. The student has several options of academic preparation for the university and of different vocational courses.

The Third Degree level covers all of the years at the university. It begins with, at least, one year of the First Cycle in one of the general core areas of study. The First Cycle is basically a year of preparation for one of the Professional Programs. This is followed by several years in one of the professional schools related to the core area.

The arrows in the diagram show the general trend in the flow of students from one level to another. To be admitted to the Third Degree level, it is necessary to complete the Second Degree and to obtain satisfactory scores on all entrance exams required by the university. To be admitted to one of the several Professional Programs, the student must fulfill the requirements of the First Cycle.

The University Entrance Examinations

For more than thirty years, admission to the university relied almost entirely on the completion of the Second Degree education, and

on specific entrance examinations. Any other evidence of academic achievement, such as school records, has not been used in the selection process.

Before the present legislation, each Program in each university required a specific entrance exam. Because of the growing number of candidates, the already existent tendency for using objective tests increased too. The advent of the computer also helped in the adoption of the objective tests by many universities. Gradually, two main characteristics of the admission process emerged and became well established: (a) almost exclusive reliance on the results of the entrance exams, and (b) use of a system to fill the quotas for students for each Program, in each university.

Present Policies

The present legislation (Fundacao Cesgranrio, 1974) covers aspects of the general process of admission to the university, as well as the basic characteristics of the exams. Universities in the same geographical region are expected to merge their admission processes gradually, either pooling their efforts, or by making use of a private specialized test development institution. This means that all operations involved in preparing exams, in registering examinees, in administering tests, in scoring, and in reporting results are to be managed by a central agency, and not by each university separately. For the student, this centralization means that he will have to get prepared for only one set of tests, and that he will pay only one exam fee, when applying to different universities and Programs. This point leads to two other features of the process: the options opened to the candidate, and the so-called system of classification. In this context, the term "classification" actually means: ranking and selecting a predetermined quota among the top scoring students.

When applying for the entrance exams, the candidate must make a declaration of a major area of study. The type of declaration depends on the university for which he is applying. In some universities, he is required to state his preferred general area of study only. For example, the Biomedical area, or the Science and Technology area. In this case, he either takes the same examinations given by the university to candidates of all areas, or he takes the set of exams required for his area. In either case, he is being selected for one of the general areas of study offered at the level of the First Cycle. The process of selection is conditioned to the student's choice of area of study. This means that the examination scores of the candidates who stated their preference for a specific area of study are ranked separately from those obtained by students whose preference was for another area. For example, even when all candidates take the same set of examinations, the final scores of those whose preference is for the Social Sciences are ranked separately from those who chose the Biomedical area, or the Science and Technology area etc.

For other universities, the candidate is required to state his choice in a more specific fashion: he must state both the Professional Program he wants to take after completing the First Cycle and also the particular school and university he wants. For example, if he wants to be admitted to one of the Medicine schools in the Sao Paulo region, he will have to apply to take exams of the Biomedical area, and will have to declare, at the time he submits his application, that he wants admission to the Medical Program in University X and School Z. Suppose the same set of examinations is taken by all candidates to the Biomedical area, which includes some 30 Professional Programs, like Medicine, Dentistry, Veterinary, Nursing, Physical Education, Biological Sciences, etc. The candidates who stated their

preference for a certain Professional Program, say Medicine, are ranked separately from all others. In the example of Figure 2, candidates X and Y stated their choice of the Medical Program. Therefore, they will be ranked among other candidates who have made a similar choice. In the example of Figure 2, there is a total of 366 vacancies for the Medical schools in the region. If candidates X and Y scores are among the top 366 of the Medical candidates, they will be considered for admission to the school of their choice. Then, for each choice of school, the ranking process is repeated. Suppose, for example, that candidate X does not rank high enough among the candidates whose first choice was school A, in order to surpass the top 100 in this group. Then, he will not be admitted to school A, and he will not enter any other ranking process because he stated this sole option of school. However, candidate Y will have a chance of being admitted to one of the four schools; if he does not rank high enough among the candidates who stated their choice of school A, which is his first choice, he will enter the ranking process for those who chose school B, his second preference, and so on until school D, which is the last one in the order of his preference. A similar procedure applies to the example of candidate Z, whose first and second choices are for the Nursing Program, and a third choice is stated for the Biological Science Program. If Z does not rank among the top 120 candidates for the Nursing Program, he will enter the ranking process relative to candidates for the Biological Science Program.

In this system, the so-called "classified" candidates are the ones admitted to the university.

Basic Characteristics of the Entrance Tests

The present legislation goes into the specific aspects of the examinations themselves. The content of the entrance exams must

correspond to that of the core courses of the Second Degree schools (Fundacao Cesgranrio, 1974). The core courses cover[1]: Language, Social Studies, Sciences and Mathematics. Although all these subjects must be represented on the exams, different areas of university study may require that more importance be given to some of the subjects than to others. This may be done by using different weights when combining several scores into final score. In general, however, the examinations must not surpass the difficulty level of the core courses of the Second Degree schools. Among the legislative recommendations are: (a) using objective tests, (b) transforming test scores into standard scores, and (c) avoiding questions involving sheer memorization. A minimum of four different subject matter tests is required (Fundacao Cesgranrio, 1974). One of the points stressed is that all candidates should take the tests under the same conditions. That is, the information available about the tests, the administrative conditions, the scoring, the selection and the reporting procedures must be equal for all of the candidates.

The examination characteristics that are of interest here will be described under three topics: type of questions; test construction, administration and scoring; and reliability and validity.

The data on which this section is based come from two specialized test development institutions: the Carlos Chagas Foundation and the

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[1]The content of the core courses is the following: Language (Portuguese, Brazilian Literature, at least one Foreign Language); Social Studies (Geography, History, Brazilian Social and Political Organization), Sciences (Physics, Chemistry, and Biology), Mathematics (Arithmetic, Algebra, Geometry, Trigonometry, and Linear Algebra).

Cesgranrio Foundation[1]. The first deals only with the Biomedical area. The second is responsible for exams covering three areas: Biomedical, Science and Technology, and Social Sciences and Humanities (including communication, law, education, arts, and administration).

Although almost all subject matter areas are represented on the exams of the two institutions, they cannot be taken as a basis for generalizations about other specialized institutions or to other schools.

Type of questions. Every year, once the examination process is completed, the questions are published. All the questions of the 1974 exams are of the objective type (Fundacao Carlos Chagas, 1974; Fundacao Cesgranrio, 1974). A definite preference is for the multiple-choice item, with five alternatives, only one being right. The type of item usually called "best answer" is not employed generally. In some tests there are a few items of the matching form. A great use is made of tables, graphs and maps[2].

Within limits, there are differences in the content covered by the exams for the same area of study when they are constructed by different institutions. Table 1 shows an example of how the tests developed by two institutions compared in 1974.

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[1]The Carlos Chagas Foundation is located in the state of Sao Paulo, which had about 37% of the total of all candidates in the country, in 1972 (Ministerio da Educacao e Cultura, 1974). The foundation examined, in that year, about 9.4% of the total for the state, i.e., 14,200 candidates (Fundacao Carlos Chagas, 1975). Cesgranrio Foundation serves two other states in which in 1972 about 15% of the candidates in the country were concentrated (Ministerio da Educacao e Cultura, 1974). Out of these, Cesgranrio examined 28,000 i.e., about 44% (Serpa de Oliveira, 1973).

[2]In 1975, the question of the reliability and of the advantages of the essay tests was revisited, since some universities required this type of test for a few areas of study.

content coverage of the examinations may differ depending on the university program to which a candidate applies. For example, the Language tests developed by Cesgranrio were identical for both Science and Technology candidates and for Biomedical candidates. However, the Physics and the Mathematics tests for the Science and Technology candidates had 50 items each, while these same tests for the Biomedical candidates had 25 items each. Thus, these longer tests allow for a more thorough subject-matter coverage when testing Science and Technology candidates.

The test constructors show individual differences too, in organizing each test and in formulating the questions. In some cases, the items of the Language tests all refer to a longer text. There may be items requiring reading comprehension, items on grammar, and items on literature based on this same text. Others prefer to use short paragraphs for interpretation and to formulate questions that require a variety of behaviors, like choosing the correct word to complete a sentence, the correct expression to substitute for others in a sentence, or marking a grammatical mistake.

Thus, although different regions, or even different institutions may offer sets of tests within the same limits required by the law, these tests may differ in content, in the form in which the questions are presented, and in the extensiveness of the coverage of the Second Degree core curriculum.

Test construction, administration, and scoring. New sets of tests are constructed each year. Special "ad hoc" committees of secondary teachers and university professors are given the task of writing the new questions. In some institutions, specialized personnel in measurement organize the committees and work along with the item writer, from the stage of offering published or other instructional materials, brief training sessions and so on, up to

the point of final approval of each question. It should be said that there are very few persons in the country with specialization in measurement. Schools of education are now beginning to set up departments of educational research, measurement and evaluation. It is not easy, even for the special institutions which are responsible for entrance examinations, to recruit personnel in the field.

Published Second Degree curricula serve as outlines of the content of the entrance exams. However, the specification of what content is to be actually included in each test is done by the committees. If the members of the committees reflect the type of instructional characteristics of the teachers of the region, this will be to the benefit of the local candidates. If this is the case, it does not seem to constitute a problem, since most examinees come from the same region[1]. However, the philosophy of the particular organization in charge of constructing the tests may work against candidates not prepared in accordance with its orientation. For example, more emphasis may be given to some subject areas than to others. Longer tests may be preferred. Some tests may be weighted more than others. There may be more difficult tests for the subject areas considered to be of greater importance. All these are ways of manifesting the basic thinking of those in charge of organizing the exams. Such institutional preferences may or may not reflect the general thinking of the group of universities using the tests, concerning what should be required from the student. At this point, one might also speculate about a possible retroactive effect of such test construction trends on the instructional programs in the Second Degree school.

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[1] A questionnaire, commonly distributed to the candidates at the time of the exams, shows that 85% of the candidates for the exams of the Biomedical area, in Sao Paulo, come from the same state (Oliveira, 1975).

What about the specifications of objectives which the items should try to measure? On the basis of the material published by the specialized institutions, it is difficult to conclude how these objectives are defined, and who is responsible for the task. It seems that the influence of Bloom's Taxonomy (Bloom, et al., 1956) is wide spread. The Taxonomy has been translated by a group of university professors. Its broad categories are mentioned in the recommendations of the Ministry of Education (Fundacao Cesgranrio, 1974), and it is even mentioned in some guides written for the candidates (Fundacao Cesgranrio, 1974).

Judging by one set of instructions developed for the item writers (Fundacao Carlos Chagas, 1973), at least one institution makes a serious attempt to combine the work of the specialist with that of the teachers in all phases of preparation of each test. However, it is not possible to advance further information about the procedures for specifying objectives to be tapped by the tests items, nor about what each university school expects from the entering student.

Procedures for pre-testing and item analysis are entirely precluded, due to severe security problems. Some institutions make an item analysis of the tests after they have been administered (Vianna, 1974; Fundacao Cesgranrio, 1974). Certain types of questions may be subjected to further study on the basis of trends observed over the years. For example, a report on the 1974 Mathematics test for the Biomedical area in Sao Paulo (Vianna, 1974) calls attention to the Geometry items, which had been found to be among the most difficult and the less discriminating over the years. Since the specific content of the Geometry items is changed every year, and possibly, the item writers too, the point deserves further investigation from the measurement perspective, as well as from the point of view of the subject matter specialists.

When preparing the tests, the test constructor is placed in a difficult position. In general, the tests are not expected to surpass a difficulty level that corresponds to the Second Degree curriculum. This constitutes no problem when there are fewer candidates than vacancies. This is the situation for programs like Social Sciences, for example, for which there were 0.7 candidates for each vacancy, in the whole country in 1972 (Ministerio da Educacao e Cultura, 1974). On the other hand, for the Medical schools, the ratio of candidates to vacancies offered was equal to 9.9 in that same year (Ministerio da Educacao e Cultura, 1974). In 1974, for the Medical schools of Sao Paulo, there were 15.7 candidates for each vacancy. Table 2 shows the ratios of candiates to vacancies, for those examined at Fundacao Carlos Chagas in 1974 (Vianna, 1974).

The test constructor is faced then with the task of complying with the legal requirements while preparing instruments that will be discriminative enough to select a certain quota of candidates. More specifically, his task is to prepare one same set of tests that will be, ideally, discriminative enough among Medical candidates, in order to select the required quota for the Medical schools. At the same time, these tests should be discriminative enough among, say, the Nursing candidates, or among the Physical Education candidates, in order to select the respective quotas from the top scoros in each group. A look at the results obtained on the tests given by the Carlos Chagas Foundation, for example, shows sizable differences between the averages of students admitted to different Professional Programs, and even between schools within one Professional Program. It would be too cumbersome to reproduce all these results here. However, Table 3 summarizes data from the 1974 exams for the Biomedical area in Sao Paulo (Vianna, 1974). The table shows results for only 3 out of 8 tests. Besides

the averages for a random sample of all applicants, the table allows for a comparison of the averages of students admitted to 12 Professional Programs offered by 32 schools. The data shows that some groups of students are admitted even when their averages are below the means of all candidates taken together.

The tests are required to be administered under the same conditions for all candidates. This requirement is interpreted as administering tests to all candidates on the same day and hour. The purpose is part of assuring that no candidate has prior access to any of the questions. Of course, the need for security entails a series of steps, from the time of writing the questions through printing and up to the distribution of the tests for administration.

Administering the tests usually does not require highly trained personnel. The candidates receive printed instructions when they apply and also when the tests are administered. Students usually are familiar with several types of answer sheets, or with the use of computer cards. Specially trained monitors give the oral instructions, and are in charge of controlling the time and of keeping the proper conditions during the testing sessions. Occasionally, students in hospitals or in prisons have taken entrance tests, under special monitoring. Also, tests are specially printed for the blind and other groups. The requirement is always that the testing sessions should be held at the same time as those of the other candidates. Although the purpose of the examinations is to measure power, not speed, there are time limits. It is common practice not to administer more than two tests in one day, and the candidates know far in advance which tests will be given each day.

The two specialized institutions, on whose reports this section is based, distribute their information to the candidates during August or September (Fundacao Carlos Chagas, 1974; Fundacao Cesgranrio, 1974). The tests are administered in January. Each candidate receives a booklet containing information about the dates of the exams, the type of questions, how to answer them, how to use the answer sheets, and how the scores are determined. The booklet also contains questions from previous exams and sample answer sheets.

In the specialized institutions, the scoring process is mechanized. From scoring machines to the computers, and from the computer printouts back to the candidates. Many universities have their own computer centers, or make use of services of private companies. Obviously, the process is different for essay tests, which usually require committees for rating the responses.

For the objective tests of Cesgranrio and the Fundacao Carlos Chagas, the scoring system does not involve the use of different weights for the items in each test. Total scores are the sum of right answers, and correction for guessing is not employed. Total scores for each test are transformed into standard scores, with mean equal to 500 and standard deviation of 100. The final score is the sum of the standard scores obtained by the candidate in all tests. Some institutions assign different weights to the standardized scores from different tests before summing them.

The final scores are ranked and the selection of the predetermined quotas of students for each university program follows as described previously. When two or more candidates have identical total scores, the ties are broken by comparing individual subtests scores in a predetermined order. For example, a first comparison

may be made on the basis of their standard scores on the Language test. Then, the one ranking highest on Language will be given a higher rank. If ties persist, the comparisons follow test by test in an order which the candidates know in advance.

Reliability and validity. Some institutions report yearly estimates of the tests reliabilities, usually the Kuder-Richardson Formula 20. As an example, Tables 4 and 5 show these coefficients, along with standard errors, for the tests given in 1973 and in 1974, to the candidates for the Biomedical area in Sao Paulo (Vianna, 1974; Fundacao Carlos Chagas, 1973).

Validity studies have been scarce. Curriculum validity, apparently, has not attracted much attention of subject matter and measurement specialists. Some attempts have been made to correlate the entrance exam results and grade averages obtained in the first year of university study. The results of three studies, which were available, are summarized in Table 6.

Investigations of predictive validity face the problem of the restriction of range imposed by the selection process for each school. In 1972, for example, out of the 476,154 candidates in the country, 56% were admitted (Ministerio da Educacao e Cultura, 1973). On the other hand, a process of academic selection operates throughout the First Degree and the Second Degree levels, thus contributing to form a rather selected group even before the entrance exams to the university. Although other factors may be well operating too,

the academic selection is more immediately observable[1]. When a researcher uses data obtained from students enrolled in the First Cycle of the university, he is dealing with about 4% of those who entered the First Degree schools (Ministerio do Planejamento e Coordenacao Geral, 1973).

The criteria in prediction studies is another point of concern. Even within the same university, schools vary in their grading system. This applies to several aspects of grading: to the particular scheme chosen to assign grades to results on exams, as well as to the content and degree of difficulty of these exams. More specifically, within a school each instructor is free to choose the content and the form of the exams, or any type of assignments whose grades will enter the average of points a student attains in each subject-matter during the period of instruction. Therefore, the investigators must be well acquainted with the method of grading adopted by the particular school or course, before defining the criteria in their studies of prediction of grades from results on the entrance exams.

Perspectives for Research and Evaluation

During the last decade, educational planning has had a strong impact on the Brazilian educational system. A recent publication of the Ministry of Education (Ministerio da Educacao e Cultura, 1974) points out that in the early stages of development of educational

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[1]The academic selection operates through a minimum grade average that each student is required to obtain in order to be promoted from one grade to the next. In 1972 (Ministerio do Planejamento e Coordenacao Geral, 1973), of the 6,135,540 students in 1st grade of the First Degree schools, 23% were "repeating" the grade, i.e., were children who did not attain the minimum achievement required to be promoted to the 2nd grade in the previous year. In the same year, the number of students enrolled in the 2nd grade was 3,171,850, and those in the 4th grade represented about 30% of the number in the 1st grade.

planning, one of the greatest difficulties was the scarcity of information about the educational system. The same publication characterizes the present stage by two main efforts: (a) to solve the most crucial problems; and (b) to develop a better information system. It is explicitly recognized that much research and evaluation is needed to support the continuing development of educational plans.

It is apparent, from the previous section, that a considerable amount and variety of research is needed on measurement problems associated with university exams. Some others will be mentioned here.

The university exams are part of a social and educational context. Changes in the context may affect not just the general aspects of the process for university admission, but also some psychometric characteristics of the tests used. A quick look at the entrance exams that existed before the 1968 legislation, will provide a concrete example of a quite different context and of quite different exams. At that time, the criterion for admission of the candidates to the universities was based on a predetermined cut-off point. Every candidate whose total final score surpassed the cut-off point had a legal right to enter the university, regardless of the number of vacancies offered by the school of his choice. As increasing numbers of students obtained passing scores, there were instances in which there were two candidates for each vacancy. The process of ranking and selecting quotas of students, which is now substituted for the cut-off system, is a practical scheme to solve this problem. On the other hand, university professors used to be in charge of preparing the questions, and there was no requirement about their difficulty level. Gradually, these questions were

found to be of increasing difficulty, to a point of being far above the Second Degree level, and raised protests from the Federal Council of Education (Porto, 1970).

Currently, what are the characteristics of the exams that could serve as a basis for evaluating how useful they are in the admission process? So far, only a few institutions have published item analyses, and other basic information about the examinations. Much is ignored about the tests used in different regions of the country and about how the tests are operating within each group of candidates to specific university programs. Recall that selection operates by ranking scores separately for each group of candidates associated with a particular university program. The selection ratios for the different groups vary widely. There is an obvious need for basic information showing how well the tests are discriminating among the top scores within each of these groups, or how valid and how useful the tests are for these different selection ratios.

Changes in the composition of the groups of candidates may affect the performance of the tests in the admission process. An increasing participation of girls on the entrance exams of the Medical schools of Sao Paulo (Barroso, 1975) has been observed: from 25% of the candidates in 1966 to 37% in 1972; in 1975 they were 48% (Oliveira, 1975). Again, among Medical candidates taking exams at Cesgranrio, in 1974, the girls were 46%, and also among admitted students they represented another 45%. The situation is about the same in some other schools, like Dentistry, with 43% of female candidates, who represented the same percentage in the total of those admitted; or in Architecture, where they were 50% among the candidates, and 59% among those admitted. The picture varies from Program to Program. For example, in Engineering, the

girls amounted to 10% of the candidates only, and to 11% among those admitted (Fundacao Cesgranrio, 1974). As increasing proportions of girls coming from the highest ability layers of the population participate in the exams, the form of the distributions of test scores may change. Although plenty of data is available, specific studies of the performance of the female candidates on the entrance exams are lacking.

There is enough data by now to extend studies of this kind over the years, after the major changes introduced by the new legislation, since 1968. Studying the distributions of scores, over the years would be helpful in understanding how the selection procedure is actually operating. It would be very difficult to try to explain the performance of the groups over these years, since the tests may have been changed, and the groups of candidates may also have changed in their composition, their degree of preparation for the exams, etc. However, some points might be worth noting. For example, Table 7 condenses data about candidates examined by the Fundacao Carlos Chagas (Ribeiro Netto, 1973; Vianna, 1974). It shows that for some Programs, there have been dramatic increases in the ratios of candidates to vacancies. It would seem instructive to observe the shape of the distributions, by Program and by year, and to relate these to the respective selection ratios.

So far, the intent of this section has been: (a) to show what kinds of research on the entrance examinations are most needed; and (b) that when these exams are considered in the context of the entire admission process, the studies on the measurement problems may find application in other fields of endeavor. More specifically, their results may be of use to the evaluator and to the educational planner, when they make judgements about the present and the future

of the university admission policies. Looking back to the situation in the early sixties, one sees that all the activities involved in the examination procedures were secondary among others in university affairs. Right before the administration of the exams, each university would organize committees of professors to write the questions, most commonly without the help of a measurement person. When the scoring was finished, and the list of accepted candidates was finally published, the short life of the exams also ended as far as the great majority of educators was concerned (Ribeiro Netto, 1973). The cry of the educational planner for information has roots in situations like that.

From now on, educators are in a better position to contribute to improve the admission process. The newly formed departments of research methodology, measurement and evaluation will facilitate spreading notions on test use. And results of research on local problems will help in adding a more persuasive flavor to the arguments of the test specialists. Therefore, it seems plausible to argue that, in this way, studies of the tests used in the process of admission will be enlightening to those interested in broader educational questions.

Why is an evaluation of the admission process, as a whole, needed? Table 7 and Figure 3 show that the number of candidates and the number of vacancies have been increasing at different rates, until 1974. The table is an example of what happens in one subject-matter area, in one limited region. The graph indicates the trends of the total numbers in the whole country. Both suggest the same picture of what to expect in the near future regarding the ratios of candidates to vacancies. The graph also presents the curve of number of students completing the Second Degree level, per year.

It is immediately seen that, at present, it is not possible to think about the problem of university admission forecasts in terms of number of students finishing the Second Degree level. The latter is far below the number of candidates. Therefore, it seems important to raise the question of how well the present admission process will perform under the conditions of the ratios forecasted for the years to come. Evaluation of the trends shown thus far will be a starting point to get answers for questions of this kind.

Some major points will be mentioned, as examples. The purpose of the selection for admission is clearly set by the law: (a) to select candidates up to the limit of the vacancies offered by the university; (b) to assess their achievement in areas of study covered in the previous school years, and their aptitude for studies of a higher level (Porto, 1973). In other words, the objective is to select certain quotas among the candidates ranking higher in aptitude and achievement, as measured by the entrance examinations. In complying with the law, how is the procedure succeeding in the selection of the students for each program or each school? There have been criticisms, pointing out the low level of achievement of students who are admitted to some programs whose ratios candidates to vacancies are relatively low. If this is so, what criteria should define the acceptable student for those schools? If the students of lower ability tend to make certain choices of programs and/or schools, what can be expected under the increasing competition for vacancies offered by other programs? Is the process of admission coming to influence the students' vocational choices, after all?

An evaluation of the present process of admission might furnish feedback to improve the current educational system, and

answer basic questions that are of obvious importance for future planning. To the point that it is grounded on research and on a variety of objective information, so much the better for the university and for the prospective student.

Summary

This paper describes general aspects of the entrance examinations to the Brazilian universities. The structure of the educational system has been briefly presented showing that students having completed the Second Degree school pass to a one year First Cycle and then immediately to a Professional Program of their choice. To enter the First Cycle, or the first year of university studies, students are required to pass entrance examinations.

The paper focuses the present policies which regulate the whole procedure of admission to the university, and describes how the examinations are processed.

The need for much research on measurement matters is pointed out, as well as the possible contribution of this research to educational planning.

Finally, an evaluation of the present admission process is suggested as a proper way of considering, from an objective point of view, questions that are basic to future planning.

References

Barroso, C. L. M. Estudo de predicao do comportamento academico II. (Prediction of achievement in university: Study II). Cadernos de Pesquisa, 1972, 5, 55-76.

Barroso, C. L. M. A participacao da mulher no desenvolvimento cientifico brasileiro. (Participation of women in the scientific development in Brazil). Cadernos de Pesquisa, 1975 in press.

Barroso, C. L. M., Ribeiro Netto, A. & Coelho, M. H. Estudos de predicao do comportamento academico I. (Prediction of achievement in university: Study I). Cadernos de Pesquisa, 1972, 5, 37-53.

Bloom, B. S., et al., Taxonomy of educational objectives, handbook I: Cognitive domain. New York: Longmans, Green, 1956.

Fundacao Carlos Chagas, Cescem. Analise do desempenho dos candidatos ao concurso vestibular da area Biomedica. (Performance of the candidates on the exams for the Biomedical area). (Mimeo). Sao Paulo: Fundacao Carlos Chagas, 1973 (a).

Fundacao Carlos Chagas. Instrucoes para a construcao de itens. (Instructions for writing objective items.) (Mimeo). Sao Paulo: Fundacao Carlos Chagas, 1973 (b).

Fundacao Carlos Chagas, Cescem. Manual do candidato, concurso vestibular 1975. (Guide for the candidate: entrance exams of 1975.) Sao Paulo: Fundacao Carlos Chagas, 1974 (a).

Fundacao Carlos Chagas, Cescem. Provas escritas, 1974. (Examinations, 1974.) Sao Paulo: Fundacao Carlos Chagas, 1974 (b).

Fundacao Carlos Chagas. Um decenio a servico da educacao e cultura. (Ten years serving education and culture.) (Mimeo). Sao Paulo: Fundacao Carlos Chagas, 1975.

Fundacao Cesgranrio, Departamento de Pesquisa. Analise do questionario de informacoes sobre o candidato: Comcitec, 10. volume. (Questionnaire to the candidates of the area of Science and Technology, vol. 1.) Rio de Janeiro: Fundacao Cesgranrio, 1974 (a).

Fundacao Cesgranrio, Departamento de Pesquisa. Analise Tecnica das provas, 1974. (Examinations of 1974: Technical report.) Rio de Janeiro: Fundacao Cesgranrio, 1974 (b).

Fundacao Cesgranrio. Legislacao atualizada: Concurso vestibular, (Present legislation: University entrance exams.) Rio de Janeiro: Fundacao Cesgranrio, 1974 (c).

Fundacao Cesgranrio. Roteiro do candidato, 1975. (Guide for the candidate to the entrance exams of 1975.) Rio de Janeiro: Fundacao Cesgranrio, 1974 (d).

Ministerio da Educacao e Cultura, Servico de Estatpstica da Educacao e Cultura. Sinopse estatistica do ensino superior, Brasil-1973. (Statistics of the Third Degree level of education, Brazil-1973.) Rio de Janeiro: Ministerio da Educacao e Cultura, 1973.

Ministerio da Educacao e Cultura, Departamento de Assuntos Universitarios. Pesquisa sobre demanda no ensino superior. (Candidates and vacancies for the Third Degree level in 1972.) Brasilia: Ministerio da Educacao e Cultura, 1974.

Ministerio do Planejamento e Coordenacao Geral, Instituto Brasileiro de Geografia e Estatistica. Anuario estatistico do Brasil. (The Brazilian statistical yearbook.) Rio de Janeiro: Instituto Brasileiro de Geografia e Estatistica, 1973, 34.

Oliveira, L. L. Questionario de informacoes: candidatos ao concurso vestibular da area Biomedica. (Survey of the social characteristics of the candidates of the Biomedica area.) (Mimeo) Sao Paulo: Fundacao Carlos Chagas, 1975.

Porto, V. S. Exame critico da atual legialacao sobre o concurso vestibular. (Analisis of the present legislation about the university admission process.) Ciencia e Cultura, 1970, 22(3), 22-35.

Ribeiro Netto, A. Selecao para a universidade e pesquisa para a educacao. (University entrance exams and educational research.) Sao Paulo: Fundacao Carlos Chagas, 1973.

Rodrigues, A. Testes de aptidao na selecao de candidatos ao ensino superior. (Aptitude tests in the selection of candidates to the Third Degree level.) Relatorio Tecnico, Fundacao Cesgranrio, Rio de Janeiro, 1974, No. 1.

Serpa de Oliveira, C. A. A Fundacao Cesgranrio: Caracteristicas e objetivos, (Cesgranrio Foundation: Characteristics and objectives.) In Fundacao Cesgranrio, 10. Simposio internacional de acesso ao ensino superior. Rio de Janeiro: Fundacao Cesgranrio, 1973.

Vianna, H. Avaliacao das provas do concurso vestibular da area Biomedica. (Report on the entrance exams for the Biomedica area.) Sao Paulo: Fundacao Carlos Chagas, 1974, in press.

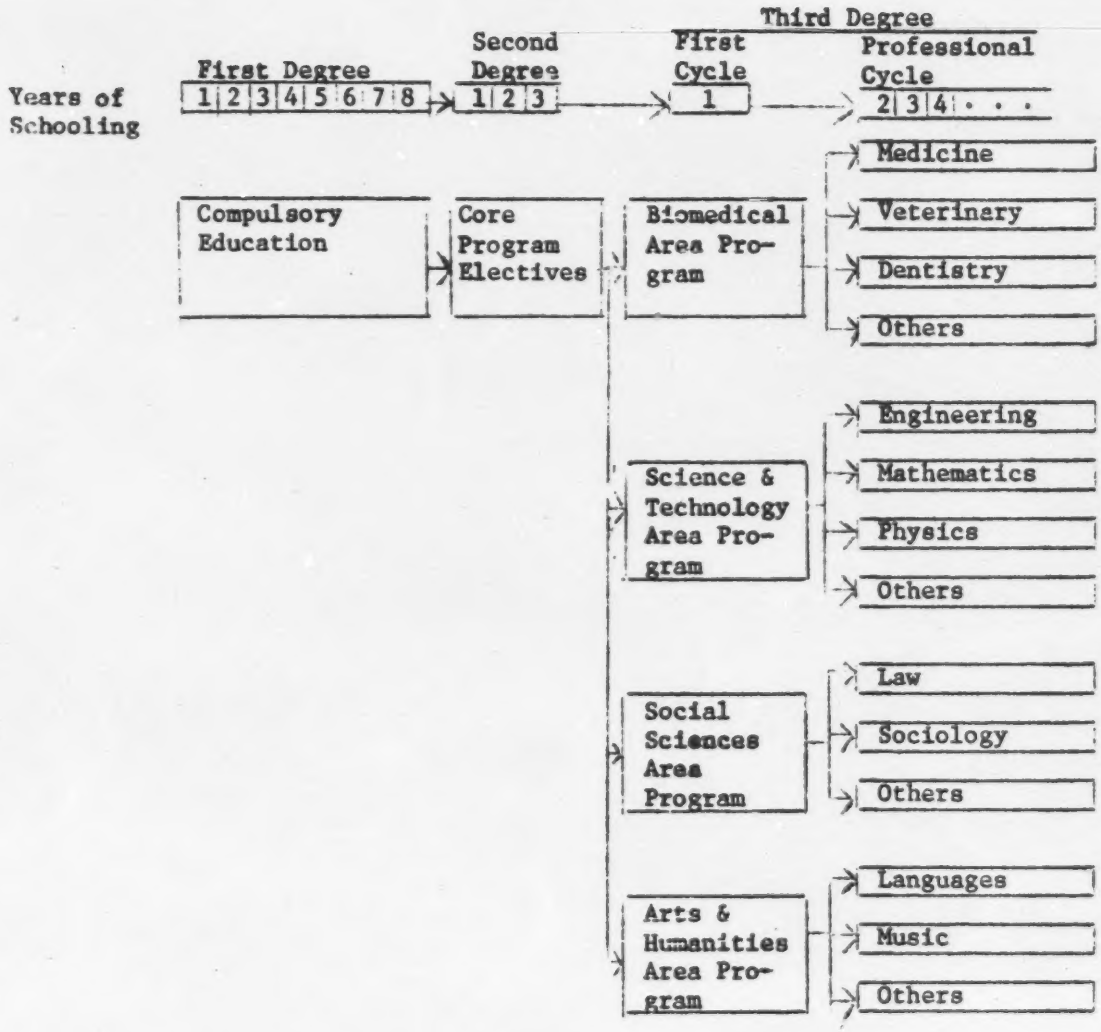

Figure 1. Structure of the Brazilian Educational System

Candidate Preference			Professional Program	University	School	Number of Vacancies
X	Y	Z				
1st	1st		Medicine	U.S.P.	A	100
	2nd		Medicine	U.S.P.	B	80
	3rd		Medicine	E.P.M.	C	125
	4th		Medicine	F.M.J.	D	61
			Veterinary	U.S.P.	E	100
			Pharm./Biochem.	U.S.P.	F	75
			Dentistry	U.S.P.	G	83
			Dentistry	U.S.P.	H	50
			Dentistry	U.E.C.	I	80
		3rd	Biol. Science	U.S.P.	J	60
			Biol. Science	U.S.P.	K	20
			Biol. Science	E.P.M.	L	20
			Biol. Science	U.F.S.C.	M	40
		1st	Nursing	U.S.P.	N	80
		2nd	Nursing	U.S.P.	O	40

Figure 2. Hypothetical Program, University, and School Preferences of Three Candidates each taking the same Entrance Examination in the Biomedical Area, for the First Cycle, in One Geographical Region

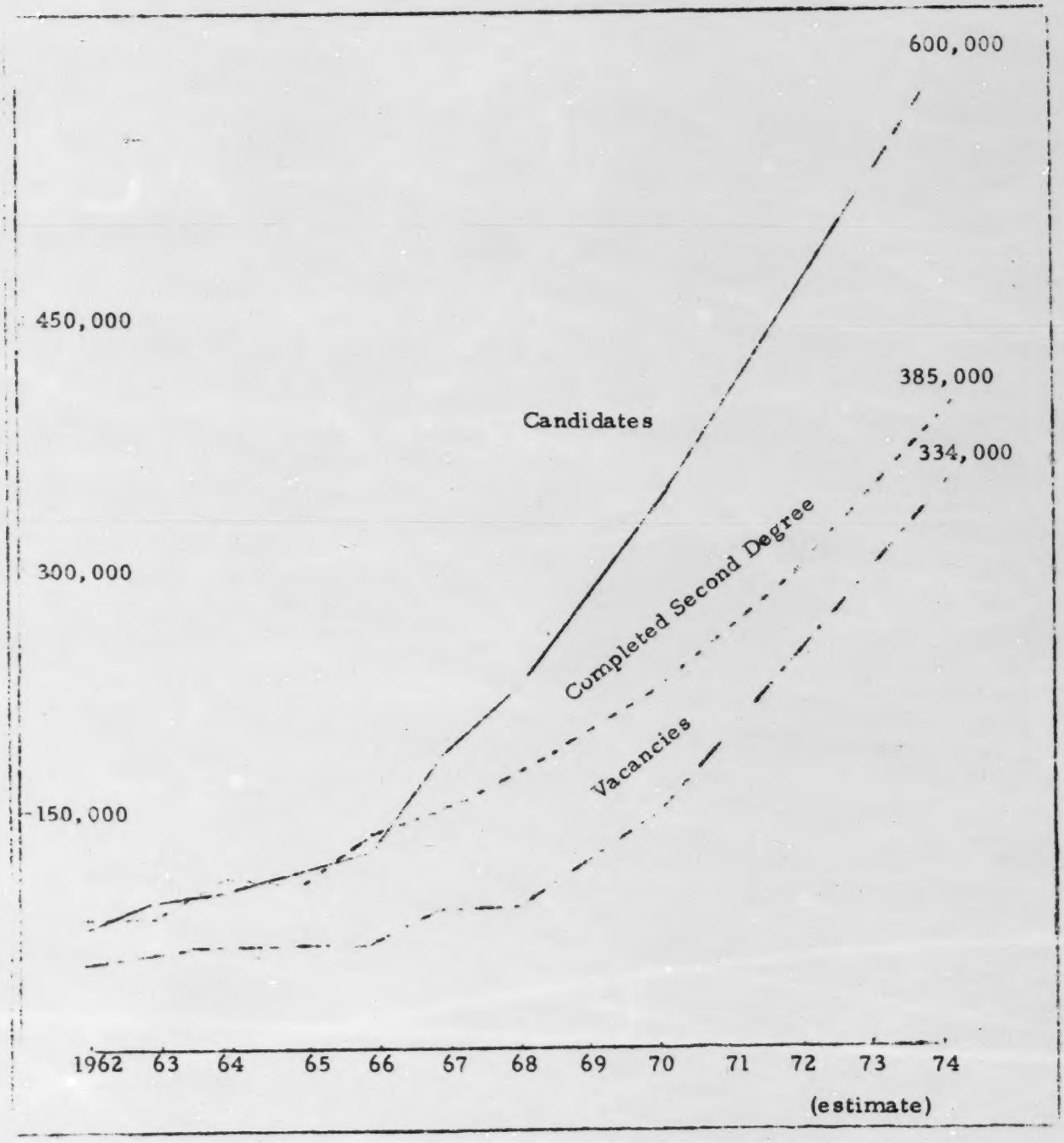

Figure 3. Number of Candidates to University Admission, Number of Vacancies Offered, and Number of Students Completing the Second Degree Level, in the Country, from 1962 to 1974 (numbers for 1974 are estimates).*

*Data from: Ministerio da Educacao e Cultura (1974).

Table 1

Comparison of the Biomedical Entrance Examinations Constructed by the Carlos Chagas Foundation and the Cesgranrio Foundation, in 1974

	Number of Items	
Subject-Matter Test	Carlos Chagas[a]	Cesgranrio[b]
Mathematics	65	25
Portuguese & Braz. Literature	100	25
Biology	75	50
Chemistry	75	50
Physics	75	25
Social Studies	75	--
French[c]	75	25
English[c]	75	25
Total Items	540[d]	200[d]

[a] Data from Vianna (1974).

[b] Data from Fundacao Cesgranrio (1974a)

[c] Candidate may choose to take either one of these.

[d] Counts French and English only once.

Table 2

Number of Candidates, Vacancies, and Ratio of Candidates to Vacancies, by Program, Biomedical Area Entrance Exams, Fundacao Carlos Chagas, 1974

Professional Program	Candidates	Vacancies	Cand. / Vac.
Medicine	8346	531	15.7
Veterinary	483	100	4.8
Pharmacy and Biochemistry	1253	135	9.3
Dentistry	1598	263	6.1
Biology	1496	440	3.4
Nursing	917	170	5.7
Agronomy	1063	225	4.7
Nutrition	398	20	19.9
Home Economics	46	25	1.8
Psychology	996	70	14.2
Physiotherapy etc.	659	85	7.8
Physical Education	366	100	3.7
Total	17621	2164	8.2

Note : - Data from Vianna (1974).

Table 3

Means and Standard Deviations for the Entrance Exams of Carlos Chagas Foundation, 1974, Obtained by: (a) Random Sample of all Applicants to the Biomedical Area; (b) Candidates Admitted to 32 Schools in 12 Professional Programs

Professional Program	School	Mathematics		Portuguese		Biology	
		$\bar{X}$	s	$\bar{X}$	s	$\bar{X}$	s
Sample (N=1667	All Schools	19.96	7.89	48.18	12.98	28.91	9.90
Medicine	1	44.5	4.8	78.6	6.70	57.2	4.6
	2	39.2	4.7	72.2	8.3	52.2	4.7
	3	37.0	5.1	69.9	8.1	50.4	4.7
	4	38.3	5.5	70.5	8.5	52.0	4.5
	5	40.0	5.5	72.8	8.0	53.7	4.1
	6	35.2	4.5	67.1	7.7	48.4	4.2
Veterinary	7	24.5	5.9	55.5	9.9	37.9	6.5
Pharmarcy & Biochemistry	8	32.4	6.2	68.4	9.3	45.4	5.2
	9	30.6	5.5	64.9	9.6	43.5	6.8
Dentistry	10	28.6	6.1	62.1	9.8	41.4	5.9
	11	26.0	6.0	56.1	10.1	38.1	5.9
	12	23.4	4.8	55.9	8.0	33.8	5.0
	13	23.4	5.1	52.6	8.5	34.3	4.5
Biological Science	14	29.2	6.0	65.8	10.7	40.9	6.2
	15	34.7	6.7	67.3	7.4	45.7	6.0
	16	30.8	7.4	67.0	8.0	44.5	7.3
	17	27.2	5.0	64.8	8.5	41.4	5.3
	18	27.0	4.6	61.9	8.5	40.0	5.8
	19	22.0	4.6	56.1	10.3	33.8	4.7
	20	19.9	4.3	52.2	7.7	30.9	4.3
	21	17.1	4.1	51.6	7.7	27.1	4.8
	22	22.5	4.4	61.0	6.5	36.3	5.4
	23	19.0	4.8	56.8	9.5	32.2	4.8
Nursing	24	25.2	5.7	59.8	9.5	36.8	5.7
	25	22.4	5.7	58.5	10.0	35.2	5.1
	26	20.7	3.6	56.0	7.8	30.7	4.7
Agronomy	27	27.6	6.3	57.1	10.4	40.4	6.3
Nutrition	28	30.2	5.4	65.6	9.5	45.0	5.4
Home Econom.	29	15.5	4.2	49.4	11.8	27.0	5.9
Psychology	30	31.0	5.9	72.0	8.2	41.4	6.1
Physiotherapy	31	25.1	4.8	60.7	8.7	36.8	8.0
Physical Ed.	32	18.6	4.9	51.5	9.9	26.3	5.3

Note. --Data from Vianna (1974).

Table 4

Means, Standard Deviations, Reliability Coefficients (Kuder-Richardson Formula 20), and Standard Errors of Measurement of the Raw Scores of the Entrance Examinations for the Biomedical Area (N=1667)

Test	Number of Items	Mean	S. D.	KR20	S. E. M.
Mathematics	65	19.96	7.89	.81	3.45
Social Studies	75	37.30	10.48	.86	3.86
English	75	29.02	12.30	.90	3.78
French[a]	75	34.09	16.11	.95	3.71
Portuguese	100	48.18	12.98	.88	4.55
Chemistry	75	27.57	11.32	.89	3.82
Physics	75	26.67	10.75	.88	3.78
Biology	75	28.91	9.90	.85	3.83

Note. --Based on random sample of all candidates to the exams given by the Fundacao Carlos Chagas, Biomedical area, 1974. Reprinted from Vianna (1974).

[a]Based on 714 candidates who took the French exams, and were not included in the general sampling of all candidates.

Table 5

Means, Standard Deviations, Reliability Coefficients (Kuder-Richardson Formula 20), and Standard Errors of Measurement of the Raw Scores of the Entrance Examinations for the Biomedical Area (N=1526)

Test	Number of Items	Mean	S. D.	KR20	S. E. M.
Mathematics	65	13. 31	7. 29	. 78	3. 43
Social Studies	75	30. 20	7. 69	. 76	3. 81
English	75	30. 38	11. 93	. 90	3. 78
French[a]	75	34. 77	15. 17	. 94	3. 72
Portuguese	100	54. 71	12. 25	. 87	4. 43
Chemistry	75	27. 98	12. 13	. 90	3. 79
Physics	75	25. 21	9. 40	. 84	3. 77
Biology	75	28. 06	8. 72	. 80	3. 85

Note. -- Based on random sample of all candidates to the exams given by the Fundacao Carlos Chagas, Biomedical area, 1973. Reprinted from Fundacao Carlos Chagas (1973a).

[a]Based on 673 candidates who took the French exams, and were not included in the general sampling of all candidates.

Table 6

Correlation Coefficients (Pearson Product Moment) Between Entrance Examinations and the Criterion of Achievement in University Studies

		Entrance Test						
Criterion	Sample	Mathematics	Portuguese	Physics	Chemistry	Biology	English	Soc. Studies
Grade Pt. Avg. at end of 1st year	52 Students[a]	.13	.16	.08	-.01	.13	-.13	.13
Grade Pt. Avg.	Students enrolled at end of 1st year[b]	--	--	.27	.28	.23	--	--
School D	N=69	--	--	--		.36	--	-.25
School F	N=79	--	--	--	.27	.38	--	-.33
Grade Pt. Avg. at end of 1st Semester in 1st Cycle in the Areas:	Students whose GPA were obtainable[c]							
Science & Technology	N=76	.23	--	.05	.07	--	--	--
Biomedical	N=50	--	--	--	.22	.35	--	--
Arts & Humanities	N=90	--	.25	--	--	--	--	.19[d]

[a] Students who were enrolled at end of 1st year, out of the 81 admitted in 1966, to the Veterinary School of USP, exams for the Biomedical area, Fundacao Carlos Chagas. Data from Barroso et al., (1972).

[b] Students enrolled at end of 1st year in Medical schools of Sao Paulo, exams for the Biomedical area in the year of 1966, Fundacao Carlos Chagas. Data from Barroso (1972).

[c] Students whose grades were obtainable, in several schools, at end of 1st semester, in 3 areas of the First Cycle, exams of Fundacao Cesgranrio, 1974.

[d] Test: History

Table 7

Ratios of Candidates to Vacancies, Biomedical Area, Examinations of the Fundacao Carlos Chagas, 1968 - 1974

Professional Program	Ratio Candidate/Vacancy						
	1968	1969	1970	1971	1972	1973	1974
Medicine	8.8	8.5	12.1	13.2	15.9	16.7	15.7
Veterinary	.6	1.2	1.6	2.3	3.1	3.6	4.8
Pharmacy/ Biochemistry	1.2	1.9	2.8	3.3	6.1	7.5	9.3
Dentistry	.8	1.7	2.3	3.0	5.2	5.5	6.1
Biology	1.7	3.5	3.7	4.1	2.9	2.9	3.4
Nursing		.7	1.9	3.6	4.6	4.4	5.7
Agronomy		3.6	4.3	3.9	3.6	3.8	4.7
Nutrition				8.4	10.7	21.1	19.9
Home Economics				3.4	3.2	2.4	1.8
Psychology			29.2	19.6	12.0	14.5	14.2
Physiotherapy etc.			10.4	6.2	6.0	7.4	7.8
Physical Education				3.1	2.5	2.6	3.7

Note. -- Data from: Vianna (1974); Riberiro Netto (1973).